

**STA REQUEST
AND DESCRIPTION OF OPERATIONS**

1. Introduction

By the instant application (“STA Request”), BAE Systems Technical Services, Inc. (“BAE Systems”) requests that the Commission grant special temporary authority (“STA”) to permit BAE Systems to operate the facilities (the “Facilities”) specified in the instant STA Request. STA is requested for a period of six (6) months from the date of grant of the STA.

2. Purpose of the Operation

BAE Systems Technical Services, Inc., through its business unit BAE Systems Integrated O&M Solutions (Electronics Systems Division) within BAE Systems Inc., will conduct the testing specified in this STA Request at the company’s Fort Walton Beach, Florida campus location. For its worldwide test range customers, this unit is a major producer of communications solutions and radar and electro-optical tracking systems. The Technology Solutions Sector (of which this unit is a part) provides operations and maintenance of U.S. military test and training ranges in support of development of high-technology weapons systems, air-to-air missiles, and munitions. This unit offers a full line of test range instrumentation systems, including radar and optical systems, in fixed or mobile configurations, and radar and optical subsystems for enhancement or upgrade of existing test range assets. Its capabilities include design, fabrication, and test of integrated hardware and software products to support range data networks, bomb scoring, and target flight characteristics using coherent systems with Doppler I&Q processing.

The testing specified in this STA Request at the Fort Walton, Florida campus is a critical part of the manufacture and delivery of a military system under the contracts identified below. As a general matter, the transmitting facilities specified in the STA Request are comprised of a CW Doppler radar that is primarily intended for tracking ballistic projectiles on a military proving ground. It will provide accurate velocity, range and positional data on the projectiles from the moment of firing until impact, or until the projectile goes out of the range of the radar. It is also capable of tracking, and providing similar information on other targets of interest including missiles, rockets, and aircraft.

Initial testing of the system at 10.43-10.44 GHz, with a fixed transmitter location, has preliminarily demonstrated the feasibility of this system at such band. Based on emergent customer needs and expressions of interest, BAE Systems requires authority to transmit on a slightly expanded band. Accordingly, BAE Systems requires authority to operate between 10-10.55 GHz on the bands specified in the attached application, at temporary fixed locations within the specified area of operation. Because preliminary tests on these expanded frequencies are anticipated to occur within a six month period from grant, STA is appropriate for this application.

The applicable contract information underlying this STA Request is as follows:

Customer/Agency: Naval Air Warfare Center – Weapons Division
Contract Number: F08650-01-C-0066-CLIN 5010AA
(Contract Modification #: P00223)
Point of Contact: Mr. Jeff Conaway (760-939-4345)

Customer/Agency: HEAD-SPD Electronics Corporation of India Ltd.
Contract Number: ESD/2007/ECIL/001
Point of Contact: B.P.R. Murthy (91-40-27125909)

In addition to implementing the above-specified contracts, authority is requested for continuing IR&D efforts for the specified Facilities.

3. Why STA is in the Public Interest

STA is being requested in order to obtain processing as expeditiously as possible so that the commencement of operation of the proposed facilities can occur as soon as possible. As a leader in technological advancements, BAE Systems continually drives new research efforts in support of the war fighter for the United States and its allies. The candidate antenna design must initially be fabricated and tested at BAE Systems' campus location pursuant to the parameters specified in the application in the next few months before being tested further at several U.S. military bases in cooperation with the appropriate spectrum managers. Accordingly, evaluation of the performance of the system must be conducted in the near term at BAE Systems' campus location before further critical tests can occur. In this particular case, authority to operate the Facilities under STA is necessary so that BAE Systems can demonstrate and verify performance of the subject system to meet applicable testing and delivery schedules.

As stated above, the testing specified in this STA Request at the Fort Walton, Florida campus is a critical part of the manufacture and delivery of a military system under the contracts identified above - and BAE Systems is not in a position to delay the commencement of these tests. Because preliminary tests on these expanded frequencies are anticipated to occur within a six month period from grant, STA is appropriate for this application. For the foregoing reasons, approval of this STA Request is in the public interest, convenience and necessity.

4. Other Issues

A. Transmitter Targets

The types of targets ("Targets") to be tracked under this experiment are:

- i. "Near-Ground Safe Projectiles" such as pellets and tennis balls, which will be fired under the sole direction of BAE Systems, solely within the confines of the BAE Systems campus, and at a height of no more than 100 feet above ground level.

- ii. “Eglin Coordinated Aircraft”, which will be certain military aircraft tracked as targets of opportunity. Transmission of radar is pre-coordinated by BAE Systems and the local Eglin-based Range Spectrum Manager/Gulf Area Frequency Coordinator.

B. Transmitter Modes of Operation and Modulation

Two modes of transmitter output are possible – “pure CW” and “stepped CW”, as follows:

- i. In the “pure CW” mode, full power can be radiated at any base frequency within the band of 10.0-10.55 GHz.
- ii. In the “stepped CW” mode (which is used in conjunction with the pure CW) the CW signal power is reduced by one-half and the other half power is then available for the stepped signal. The stepped CW signal consists of a frequency modulated CW signal having discrete frequency steps within the range of 250 KHz and 10 MHz above the base frequency listed in the above paragraph. The frequency is stepped at a 5 to 10 Hz rate. The pattern contains 3 to 10 discrete frequency offset values and the pattern is repeated throughout the test.

C. Transmitter Height

As depicted in the graphic attached hereto, the radar system will sit on top of an existing transmission tower (“Tower”) located on BAE Systems’ campus. The Tower is 6.1 meters in height above ground level. The radar system itself will extend 2.4 meters above the top of the Tower. The ground elevation at this site is 23 feet (MSL). Finally, as depicted in the attached graphic, it is noted that the Tower itself is shielded by an existing building immediately adjacent to the Tower. Accordingly, the radar system should pose no threat to aeronautical navigation.

D. Other Technical Issues Related to Reduction of Potential Interference

i. Directionality and Variable Transmit Antenna Beamwidth

The transmit antenna is highly directional, and will lock on its Targets during transmission rather than rotating during transmission. The transmit antenna is comprised of an array of 16 (4’ x 4’) planar array modules. Accordingly, the transmit antenna beamwidth is variable and such variability is achieved by controlling the number and location of radiating elements within the antenna at any given moment. The beamwidth associated with each of the requested output power levels is shown below:

<u>Output Power</u>	<u>Beamwidth (-3dB)</u>
20 W	4.4°
80 W	2.2°
320 W (maximum Output Power)	1.1°

ii. Variable Gain

As with respect to beamwidth, antenna gain is variable and achieved by controlling the number of radiating elements within the antenna. The gain associated with each of the requested output power levels is shown below:

<u>Maximum Output Power</u>	<u>Antenna Gain (dBi)</u>
20 W	29 dBi
80 W	35 dBi
320 W (maximum Output Power)	41 dBi (maximum gain)

iii. Variable Power/Limited Intended Use at Maximum Power

The transmit Output Power is continuously variable from a maximum of 320 watts to a minimum of 320 microwatts. As explained above, a further reduction in power using stepped control is possible, resulting in an output power of less than 20 microwatts. In the off state, no measurable power will be radiated.

Although a maximum Output Power of 320 watts is requested in the instant STA Request, BAE Systems notes that a majority of its transmissions for this experiment will not occur at any level near maximum power. In other words, during normal testing the transmitter will seldom radiate the full power. Full power is only necessary when tracking small targets at long distances. Most factory testing will be carried out by either using a remote low-power test generator to stimulate the receiver, or by transmitting a lower power signal (<50 watts) since the size of the available factory test facility is small and a high power signal will overload the receiver under those conditions. High power testing will be limited to the testing necessary to establish that the system functions properly at full power.

Specifically, BAE Systems anticipates that its percentage of operations at or below each requested power level for this experiment will be as follows:

<u>Output Power Level</u>	<u>Anticipated % of Transmissions</u>
20W or below	60%
Between 21W-80W	30%
Between 81W-320W	10%

iv. **Azimuth and Elevation Blanking Capabilities**

BAE Systems understands that FAA (or other stakeholders) may require certain limited azimuth and/or elevation blanking in order to ensure that the proposed Facilities do not pose a threat of interference to adjacent emitters. Accordingly, this is to confirm that the subject radar system does have such blanking capabilities and that BAE Systems stands ready to work with FAA to identify any reasonably necessary azimuth and/or elevation restrictions for the system.

v. **Coordination with Spectrum Range Manager**

Any transmissions under this STA Request directed toward aircraft will be limited to military aircraft targets originating from Eglin Air Force Base and Hurlburt Field. In accordance with BAE Systems standard practices, transmission is pre-approved and pre-coordinated by BAE Systems and the local Eglin-based Range Spectrum Manager/Gulf Area Frequency Coordinator.

vi. **Compliance With Human Exposure Limits**

BAE Systems certifies that it will operate the requested Facilities in full compliance with the standard IEEE C95.1-1991, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

vii. **Stop Buzzer**

BAE Systems hereby advises the Commission BAE Systems' Ron VanOeveren will be personally conducting the tests and will be available by wireless telephone at (850) 240-3203. Mr. VanOeveren will act as a "stop buzzer" if any issues regarding interference arise during testing.